

# Climate Disruption: Searching for Sustainability in Southern California

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Although the general public has grown weary of bad news about the economy and world affairs, the most enduring form of bad news (as well as opportunity) may be the rate of climate change taking place in the atmosphere and oceans.

The science of climate change is rapidly evolving into a science of climate disruption. While forecasts of the magnitude of climate forcing impacts have not changed dramatically, the observed rate of change has surpassed earlier predictions of most climate scientists with disturbing speed. In Southern California, much of this acceleration in climate impacts is invisible. Most of it is taking place in faraway places, such as the Arctic and Antarctic regions, in the polynyas of Greenland and the breakaway zones of the Larsen ice shelf, or in the drying of the Amazon rainforest, the shifting of the East Asia monsoon, the slowing of the North Atlantic current, and a host of other changes emerging from the Sahara to the Tibetan Plateau. Unless one looks closely at trends in wildfire intensity or long-term drought cycles, it is hard to find evidence of mounting climate disruption in the SCAG region.

Unfortunately, Southern California, like the rest of the world, is biogeochemically committed to unseen future changes because of the lag times in climate dynamics and the long atmospheric residence times of many greenhouse gases (e.g., CO<sub>2</sub> released today remains in the atmosphere for an average of more than 100 years). It is too late to stop the climate “train,” but slowing it down may be sufficient, if we are lucky.

Even if the world could somehow stop emitting greenhouse gases today, it is inevitable that climate impacts of past emissions will be felt for many centuries. Some adaptation to changes in climate will be required for the foreseeable future. Whether the adaptation will be merely inconvenient or impose wrenching adjustments in our way of life cannot be forecast with any confidence. What seems certain is that the carbon blanket covering the earth is getting thicker and very likely to produce changes and feedback loops that could threaten the economies and ecosystems of very large regions of the world. Researchers at the University of California, Berkeley (Roland-Holst and Kahrl 2008, p. 3), have estimated that statewide damage costs of climate disruption in California will range from \$7.3 billion to \$46.6 billion per year, in 2006 dollars. Real estate assets valued at \$2.5 trillion are at risk from sea level rise, extreme weather, and increased wildfire dangers [p.7]. Even if Southern California were somehow spared any major direct impacts of climate disruption, the collateral damage from impacts affecting other regions could be very severe. In a tightly-coupled global economic system, the notion of climate winners and losers is likely to give way to a sobering truth: the so-called “winners” will simply lose more slowly.

In stark contrast to this grim picture of changes in the climate system are a series of promising measures for transforming our energy, transportation, and land use plans and practices.

Such a transformation is driven not only by climate fears, but by vast technological and behavioral opportunities for securing a sustainable future for our children and the generations that follow. The simultaneous meltdowns on Wall Street and Greenland are fostering a search for bold new solutions.

Both types of meltdowns may encourage the acceleration of green energy technology, though continuing financial meltdowns could slow or divert investments in climate protection measures, thus hastening glacial meltdowns. With sufficient economic stimulus, however, the response to the climate challenge may aid in long-term economic recovery. Moreover, it may help us recover our sense of community. Never before has the urgency of a global problem aligned so closely with the local solutions of community-based transformation. And never before has the need for “glocal” (global + local) integration of planning, design, economic revitalization, and visionary leadership emerged with such urgency.

Central to the implementation of “glocal” climate solutions are the regional institutional capacities and shared community visions needed to overcome the inertial barriers to social and political change. While interlocking slow-motion crises in the climate system need to be addressed internationally, they must be framed at levels of action that are small enough to engage individual communities and large enough to capture the regional synergies and economies of scale made possible by a “community of communities.” Herein lies the promise of regional metropolitan planning and governance for addressing the challenge of climate disruption. Organizations like SCAG are strategically well positioned, given adequate resources, to play a vital role in assessment, planning, and integrated management of both regional greenhouse gas reduction initiatives and local adaptation strategies needed for coping with climate disruption.

Regional climate solutions are likely to require a delicate balance between greater self-sufficiency in energy supply – using alternative fuels and technology – and greater emphasis on demand-side management in transportation, land use, and urban design.

Curbing greenhouse gas emissions by reducing sprawl, inefficient vehicle travel, and energy-intensive buildings, are all major goals under California's growing set of initiatives to combat climate disruption. The latest of these measures, SB 375, directs the California Air Resources Board to establish regional targets for greenhouse gas emissions that can be used in planning and urban growth management. Signed by the governor in September, 2008, the new law builds on the Global Warming Solutions Act of 2006 (AB 32) by strengthening land use strategies for reducing emissions of greenhouse gases.

Achieving these goals and strategies will be very difficult without accompanying breakthroughs in energy technology and consumer behavior. Although major studies (e.g., Pacala and Socolow 2004) conclude that the U.S. can achieve a 50% reduction (7 gigaton/year) in projected carbon emissions by the middle of this century, using technologies already demonstrated at industrial scales, the debate over the costs of deploying these technologies in some optimal mix is far from over. The relative costs of various solar, wind, biofuel, "clean" coal, nuclear, and other energy configurations are highly dependent on getting the posted prices "to tell the ecological truth" (Roodman 1999). Any subsidies and hidden costs must be considered in the comparative lifecycle assessment of energy technologies, as well as the net benefits they provide for people and climate stabilization.

During the transition to carbon-free energy sources, "bridging strategies" will be needed, based on energy options that have already been commercially demonstrated, with choices ranging from T. Boone Picken's heavily marketed vision of natural gas vehicles and wind power farms to Amory Lovin's pragmatic vision of "factor four" improvements in energy use efficiency (Weizsacker 1998).

But the most promising near-term strategies, in addition to expanded energy conservation, may rely on plug-in hybrid vehicles and distributed electrical generation of renewable energy technologies.

Plug-in hybrids (PHEVs) offer the features of battery-powered travel for local trips, backed by an internal combustion engine for more extended travel. Unlike natural gas-powered vehicles, they do not require an expensive new refueling infrastructure, since they can be plugged into common 120-volt outlets with an extension cord. The carbon-saving effectiveness of a 100-mile-per-gallon PHEV looks very promising, even when recharged in a coal-dominated electricity grid. But the total carbon and air quality benefits for society, like those of other green vehicle technologies, will depend heavily on fleet penetration (turnover) rates, which will in turn depend on perceived affordability and, perhaps, a willingness on the part of both auto manufacturers and buyers to elevate their roles as citizens, parents, and stewards – not just producers and consumers – when they make choices about transportation.

Southern California leads almost all other regions of the world in terms of its commercial potential for distributed generation of electricity from renewables. In addition to excellent solar insolation levels and nearby mountain passes noted for their wind power potential, the region offers two other key assets that support renewable energy development: huge expanses of rooftops, especially on warehouses, that will accommodate photovoltaic installations, and even larger areas of open space in the Mojave desert, suitable for both wind and solar installations. Because the development of renewable energy in the desert involves added environmental and land use conflicts, along with encroachment on existing military operations, it will be important to address systematically

the scale and ownership of proposed renewable enterprises in the region, especially in terms of siting compatibility, lifecycle cost, political feasibility, and overall sustainability.



Perhaps the most immediate climate solution needed in the Los Angeles region is fuel efficiency improvements in conventional highway vehicles. In this instance, the solution is not regional -- e.g., drilling for oil off our coast. Instead, we need to “drill” for oil in Detroit and other vehicle manufacturing capitals, by improving average fuel economy of new vehicles by at least 1-3 miles per gallon each year, for the foreseeable future. Nothing we can do cost-effectively on the supply side, in the face of peak oil and the geopolitics of oil imports, is likely to match what we can achieve with cost savings on the

demand side. It is simply cheaper to conserve a barrel of oil (and its avoided carbon emissions) through efficiency improvements than it is to find and extract a new one (and control its emissions). Unfortunately, the state of the economy, especially as it affects Detroit automakers, may constrain efforts to achieve higher fuel efficiency standards, despite being more than 20 years overdue. While volatile gasoline prices may foster additional growth in demand for more fuel-efficient, hybrid, and alternative fuel vehicles, not to mention mass transit, it is by no means assured that carbon emissions will respond to conventional energy market forces in a timely fashion. Just as the climate system exhibits important lag effects in its behavior, so does an economy that is heavily based on cheap oil and strategic dependence on private automobiles.

Ultimately, meeting the challenge of climate disruption will require more than technological advances and redirected market forces. It will very likely require a reconceptualization of the relationships between morality, sustainability, and community. Sustainability -- i.e., the strategic integration of goals for ecological integrity, economic vitality, and social equity -- is becoming the “guidestar” of planning and policy for effective climate solutions. Southern California, more than any other metropolitan region, has the image-making industry and “glocal” perspective needed to lead in this effort. Already, the concept of “sustainable communities” is being incorporated in regional planning and in California’s statewide climate initiatives (e.g., SB 375). Skeptics will rightly point out that the ideal of sustainable communities is just that, an ideal, and perhaps not worthy of serious policy and planning responses. But they need to consider that our society’s most precious ideals -- freedom, democracy, faith -- are, like sustainability, full of ambiguity, impossible to define with precision, and often misappropriated by people who value them more for their marketing



appeal than for their power to change the future. We have not given up on democracy in these situations, and we should not hesitate to embrace sustainable communities for the same reason – it makes us a better and more secure people.

By emphasizing the importance of intercommunity cooperation in achieving sustainability, actions needed to curb greenhouse gas emissions become part of a much larger and more rewarding way of life. They help promote pedestrian-friendly villages and public transit-oriented development, urban infill, green building design and many features that enhance livability, public safety, and the environmental health of all residents. Metropolitan approaches help individual communities avoid designs, development strategies, and capital allocations that produce unsustainable outcomes for neighboring communities and for the region as a whole. It is the preferred approach because it fosters a scale of action and exchange that is big enough to address key interdependencies of climate, ecology, and socioeconomic vitality, yet small enough to provide a shared sense of place and social embeddedness.

In the face of climate disruption, metropolitan regions may provide the optimal scale at which to attempt the integration of governance, planning, economic development, and environmental monitoring.

Beyond the issues of scale and integration lies the greatest challenge of all: convincing ordinary individuals that climate solutions entail more in the way of opportunity than sacrifice. Currently, the perception of most Americans seems to be that climate protection may lead to large and unacceptable levels of sacrifice. An entire industry of climate skeptics has been organized to perpetuate that perception (Jacques, Dunlap, and Freeman 2008). Noted author Carl Safina (2008) reaches a very different conclusion:

*Of all the psychopathology in the climate issue, the most counterproductive thought is that solving the problem will require sacrifice. As though our wastefulness of energy and money is not sacrifice. As though war built around oil is not sacrifice. As though losing polar bears, ice-dependent penguins, coral reefs, and thousands of other living companions is not sacrifice. As though withered cropland is not a sacrifice, or letting the freshwater of cities dry up as glacier-fed rivers shrink. As though risking seawater inundation and the displacement of hundreds of millions of coastal people is not a sacrifice – and reckless risk. But don't tell me to own a more efficient car; that would be a sacrifice!*

## About the Author

Monty Hempel is Hedco Professor of Environmental Studies and Director of the Center for Environmental Studies at the University of Redlands. Through a series of articles, two books, and a dozen documentary films, he has addressed a wide range of environmental science and policy issues, ranging from coral reef protection in Palau to the human dimensions of global climate disruption. Dr. Hempel is currently president of the Association of Environmental Studies and Sciences (AESS) and serves on the executive committee of the national Council of Environmental Deans and Directors (CEDD). He is also a founding board member of the Association for the Advancement of Sustainability in Higher Education (AASHE).

## Additional Resources

National Academies of Sciences, Understanding and Responding to Climate Change (2008 Edition). Download report as PDF at <http://dels.nas.edu/climatechange/basics.shtml> (3.3 MB)

James Hansen et al, "Target Atmospheric CO<sub>2</sub>: Where Should Humanity Aim?" (March 31, 2008). Download report as PDF at [http://www.columbia.edu/~jeh1/2008/TargetCO<sub>2</sub>\\_20080407.pdf](http://www.columbia.edu/~jeh1/2008/TargetCO2_20080407.pdf)

Intergovernmental Panel on Climate Change:  
<http://www.ipcc.ch/>

California Climate Risks and Estimated Costs:  
[http://www.next10.org/research/research\\_ccrr.html](http://www.next10.org/research/research_ccrr.html)

"Green L.A.: An Action Plan to Lead the Nation in Fighting Global Warming:"  
[http://www.lacity.org/ead/EADWeb-AQD/GreenLA\\_CAP\\_2007.pdf](http://www.lacity.org/ead/EADWeb-AQD/GreenLA_CAP_2007.pdf)

For broad coverage of climate science, politics and economics, go to the Pew Center for Global Climate Change: <http://www.pewclimate.org/>

For access to science debates and technical discussions about climate, go to Real Climate: <http://www.realclimate.org/>

For point-counterpoint analysis of climate arguments and controversies, see Coby Beck's detailed guide, "How to Talk to a Climate Skeptic": <http://gristmill.grist.org/skeptics>

## References

Jacques, Peter, Dunlap, Riley, and Freeman, Mark, 2008. "The Organization of Denial: Conservative Think Tanks and Environmental Scepticism," *Environmental Politics* 17 (3), 340-385.

Pacala, Stephen, and Socolow, Robert, 2004. "Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies," *Science* 305 (5686): 968-972.

Roland-Holst, David, and Fredrich Kahrl, California Climate Risk and Response (November 2008, available online at [www.next10.org](http://www.next10.org))

Roodman, David, 1999. *The Natural Wealth of Nations* (Worldwatch Institute)

Safina, Carl, 2008. "The Moral Climate," *Orion* (September-October 2008).

Weizsacker, Ernst, Lovins, Amory, and Lovins, L. Hunter, 1998. *Factor Four: Doubling Wealth, Halving Resource Use – A Report to the Club of Rome* (Earthscan).